

REMARKS

Claims 1-4, 7-17 and 44-51 are pending in the application. Claims 1-12 and 14-17 were rejected, but allowable subject matter was identified. Claims 5-6 are hereby canceled, without prejudice. Claim 13 was withdrawn from consideration as drawn to a non-elected species. Claims 18-43 were withdrawn from consideration as drawn to non-elected inventions, and are hereby canceled without prejudice. Claims 44-51 are added.

Restriction/Election

The restriction requirement and telephone election of Group and Species noted in the Office Action is acknowledged and affirmed. With regard to the species election, original pending claims 1-4, 7-11, 14, 16 and 17 are readable on the elected species, as well as new claims 44-51. Claim 1 is generic.

The indication in the Office Action that the elected species of the first material constitutes allowable subject matter is gratefully acknowledged. It is noted that the examiner has accordingly proceeded to consider additional species of the first material of the generic claims.

Examiner's Amendment

The Examiner's Amendment, for which authorization was given by Applicants' representative, is acknowledged and affirmed.

Priority

With regard to the applications noted by the Examiner, this application is a continuation-in-part of Application No. 10/731,771, which is a continuation-in-part of Application No. 10/686,189, as reflected on the first page of the specification and on the filing receipt.

Information Disclosure Statement

The Examiner's remarks regarding the Chu et al. and EP 0111213A2 references are acknowledged and affirmed.

Specification

The objections to the disclosure are noted and the references to the various US patent applications have been updated by amendment as requested.

Claim objections and rejections under 35 U.S.C. §112

Claim 3 has been amended to obviate the noted rejection under 35 U.S.C. §112, second paragraph. Support for the amendment to claim 3 can be found at page 20, lines 12-13, for example. It is respectfully submitted that the scope of the affected claim is not narrowed by these amendments, but an alternative feature is recited. Withdrawal of the rejection in view of this amendment is respectfully requested.

Other Claim Amendments

Claims 5 and 6 have been canceled, without prejudice, consistent with the amendment to claim 1, discussed below. Claims 9-11 have also been amended to focus on particular embodiments of the present invention. The dependencies of claims 16 and 17 have been changed to correct clerical errors.

Claim rejections under 35 U.S.C. §102 and 103 and Allowable Subject Matter

Claims 1-3, 5-12 and 16 are rejected under 35 U.S.C. §102(b) as being anticipated by US 5,314,765 to Bates (Bates '765). Claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over Bates '765 in view of either US 5,569,520 to Bates (Bates '520) or US 6,025,094 to Visco et al. (Visco). Claims 6, 7, 14 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bates '765 in view of US 6,485,622 to Fu (Fu). The indication in the Office Action that the elected species of the first material (the composite reaction product of Li with Cu_3N) constitutes allowable subject matter is gratefully acknowledged.

Bates '765 describes and claims battery cells which include lithium metal anodes (negative electrodes) and cathodes (positive electrodes) separated by a film of an electrolyte/protective layer, in particular LiPON. According Bates '765, which is noted in the Background section of the present application, the LiPON protective layer is coated, in particular by a deposition technique, on the anode. The method by which the protective layer of Bates is formed is distinct from the methods described in the present application in at least one very important respect: rather than depositing a protective layer on the anode material (e.g., Li), the opposite occurs in that the lithium or other active metal is deposited onto the protective layer.

As noted in the application in the paragraph bridging pages 28 and 29, this results in a significant structural difference that has significant performance implications. Commercial lithium foils are typically extruded and have numerous surface defects due to this process, many of which have deep recesses that would be unreachable by line-of-sight deposition techniques such as RF sputter deposition, thermal and E-beam evaporation, etc. Another issue is that active metals such as lithium may be reactive to the thin-film deposition environment leading to further deterioration of the surface during the coating process. This typically leads to gaps and holes in a membrane deposited onto the surface of an active metal electrode meaning that there is incomplete isolation of the active metal electrode and the material on the other side of the membrane coated on the active metal electrode. However, by inverting the process, this problem is avoided; lithium is deposited on the protective membrane rather than the protective membrane being deposited on lithium. Glass, ceramic and glass-ceramic membranes can be made quite smooth either by melt-casting techniques, cut and polish methods, or a variety of known methods leading to smooth surfaces (lithium is a soft metal that cannot be polished). Single or multiple smooth, gap-free membranes may then be deposited onto the smooth surface. After deposition is

complete, active metal can be deposited onto the smooth surface by evaporation, resulting is an active metal/protective membrane interface that is smooth and gap-free.

The existence of this smooth gap-free interface, recited in the claims as filed (see claim 1), is a feature that is absent in the cited art. Accordingly, it is respectfully submitted that the pending claims are patentable over the cited art.

Notwithstanding the foregoing remarks, to provide further distinction between the cited art and the pending claims in hopes of expediting prosecution and issuance of a patent, the claims have been amended, as follows. The recitation of LiN as a first material species has been deleted as a further way to distinguish Bates '765. In addition, the recitation of LiPON as a possible second material has been deleted, and the ionic conductivity recitation of claim 1 has been raised to at least 10^{-5} S/cm. Accordingly the claims now exclude LiPON as a second material. Since the pending claims no longer recite LiN as a first material or LiPON as a second material, it is respectfully submitted that the §§102 and 103 rejections over Bates '765 are no longer applicable and their withdrawal is respectfully requested.

Further, claim 2 has been amended to more specifically recite the composition of the first material and second materials claimed therein. The species indicated allowable (the composite reaction product of Li with Cu_3N) is a species of the newly recited composite reaction product of the active metal with a metal nitride. Support for this amendment of claim 1 is found, for example, at page 14, lines 18-31 and page 19, lines 5-19, for example, where the reaction products of active metal and various precursors that react with Li to form a first material product are described and discussed, including the specific examples of P (red phosphorus), Cu_3N , SnN_x , Zn_3N_2 , FeN_x , CoN_x , aluminum nitride (AlN) and silicon nitride (Si_3N_4); and the paragraph bridging pages 21 and 22 and at page 28, lines 4-9 where the reaction of active metal (e.g., Li) with a wetting layer (e.g., Ag, Sn or Al) coated on LiPON as the first material is described and discussed. It is respectfully submitted that the electrochemical device component as claimed with these first materials, which include the species already indicated allowable, is not taught or suggested by the cited art and is patentable. Dependent claims 9-11 have also been amended and claims 44-51 have been added to recite various more specific aspects of the claimed invention.

Accordingly, withdrawal of the art-based rejections is respectfully requested.

Claim 17

The rejection of claim 17 is incompletely stated. Clarification of this rejection is respectfully requested before it is addressed.

Double Patenting

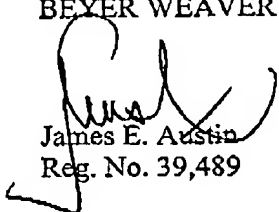
Claims 1-12 and 14-16 are provisionally rejected on the ground of obviousness-type double patenting over claims 1-20, 25, 28 and 30 of co-pending application 10/686,189. Claims in both applications have been amended during the course of prosecution. Applicants propose to

file Terminal Disclaimers in one or more of these applications, as appropriate, in order to obviate any remaining obviousness-type double patenting issues prior to the conclusion of prosecution.

Conclusion

Subject to the provision of a possibly appropriate Terminal Disclaimer, as noted above, Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below. If any further fees are due in connection with the filing of this amendment, the Commissioner is authorized to charge such fees to Deposit Account 500388 (Order No. PLUSP039).

Respectfully submitted,
BEYER WEAVER LLP



James E. Austin
Reg. No. 39,489

P.O. Box 70250
Oakland, CA 94612-0250
(510) 663-1100